of flexible tension mechanisms (9, 10, 11). There is a heel support (19) on the snowboard binding element (18) on which the back of the snowboard boot (1) can be supported. When the binding is open, the intermediate element (6) remains on the snowboard boot (1) and allows comfortable walking. The boot (1) is attached relatively flexibly via belts (9, 10, 11) on the intermediate element (6), so that even when the binding is closed, the boot is highly flexible for sideways and forward movement (Fig. 1).

Description

The invention concerns a snowboard binding according to the preamble to the patent claim. This type of snowboard binding is known from DE 44 16 531 A1.

This binding has two interlocking binding elements that can lock and unlock with one another, one of which has a bolt that can move and projects on both sides of the sole of the boot over its outer surface that can snap into a recess permanently connected to the snowboard. The unlocking device is also arranged permanently on or in the snowboard boot and is activated by hand with an activating organ arranged on the snowboard boot. This known binding is designed primarily for boots made of a relatively hard plastic shell that provide sufficient hold for the rider's foot because of their inherent stiffness, especially on the heel or the calf bone, so that the rider can put enough pressure on the back edge of the snowboard when there is stress on that edge.

Such boots are therefore used mainly by so-called Alpine and downhill boarders.

Another category of boots are the so-called "soft boots," which are very soft and thus highly flexible in all directions. In the past, such boots had mainly so-called soft or shell bindings, like those known from DE 91 13 766 U1, for example. These bindings have a heel support and an instep belt and a toe belt as well, in most cases, with which the boot is attached to the binding. The combination of such soft boots with shell bindings is used mainly by so-called free-style boarders. It allows the boarder greater freedom of motion and because of the heel support supports the foot when there is stress on the back edge of the snowboard. But the belts must be activated by hand when stepping in and out, so that automatic locking of the binding when stepping in, i.e., the so-called step-in function cannot be realized (see DE 44 16 531).

WO 95/09 035 A1 and WO 94/263 65 A1 therefore propose a "soft-step-in binding," in which one or more locking elements are built into the sole of a soft boot and in which the binding

component attached to the snowboard has receptacle elements with which the step-in function is realized. But then a heel support must be built into the boot itself, the so-called highback, which affects the flexibility of the boot in lateral movement and also reduces comfort when walking in those boots. Moreover, here again, the binding system consists of a matching boot and binding combination, i.e., the binding can only be used with special boots. Furthermore, many boarders have criticized this binding for a perceptible limitation in flexibility, since the sole of the boot is held largely fixed to the binding and the sole cannot roll to the side. In the shell bindings mentioned above, however, the boot held only by the belts can move relative to the binding to a certain degree and especially the boot, including its sole, can make lateral tilting movements in relation to the binding, which gives the boarder the high flexibility he wants.

DE 44 16023 C1 shows a so-called step-in binding for soft boots with a heel element supporting the heel and an instep element holding the front of the foot, which can swivel crosswise to the longitudinal axis of the binding between an open and a closed position. The instep element is thus joined to a chassis in the area near the front of the foot. This binding also has a step-in element, which is connected to the instep element by a lever, so when you step down on the step-in element, the instep element goes from the open into the closed position and the binding thus closes. The step-in element is held in the closed position by a locking mechanism.

The problem of the invention is to further develop the snowboard binding of the type mentioned at the beginning so that it is also suitable for boots with soft, flexible shells (so-called soft boots), allows automatic closing of the binding (the so-called step-in function), guarantees sufficient support for the heel or calf in back and still has high flexibility for lateral and forward movement, and finally can be used with largely all boots.

This problem is solved by the features specified in Patent Claim 1. Advantageous designs and variations can be inferred from the subclaims.

The basic principle of the invention is that besides the boot and the binding component connected permanently to the snowboard, there is an intermediate element that is attached to the boot and can be detached from it. This intermediate element holds a component used for locking and unlocking the binding. Preferably it is attached with belts to the boot, so that the boot can move to a limited degree relative to this intermediate element, especially sideways, and the sole of the boot can also make this movement partially. The heel support on the binding is placed on the binding component attached permanently to the snowboard, but need not be built into the boot, so the walking comfort of the boot is not affected. The intermediate element is a light, frame-like structure that only slightly limits walking in the boot, so that at least when the binding is opened for a short period of time, the intermediate element can be left on the boot. The width of the intermediate element is naturally adapted to the binding components on the snowboard. On the other hand, its width is designed so that it can be attached to all commercial boots, so that the boarder needs no boots specially designed for the binding.

Opening the binding is also very simple (the so-called step-out function), since the boarder need only activate one tension organ, which runs up at least to the top of the heel support, but in some variations of the invention runs up to any height, for example, up to the boarder's hip, so that he can open the binding without having to bend over.

The invention meets all the requirements mentioned in the above goal, although they were somewhat mutually exclusive as seen in the past.

The invention will be described in greater detail below using examples of embodiment along with the drawing.

Fig. 1 shows a side view of the snowboard binding according to a first example of embodiment of the invention;

Fig. 2 shows a section along line II-II in Fig. 1;

Fig. 3 shows a section similar to Fig. 2, but for a second and third example of embodiment of the invention;

Fig. 4 shows a partially sectioned top view onto the binding component in Fig. 1 attached permanently to the snowboard;

Fig. 5 shows views of the intermediate elements in two variations of the invention.

The same reference numbers are used on the individual figures to mark the same parts or those that correspond functionally to one another.

Fig. 1 shows a snowboard boot 1, whose sole 2 has a toe part 3, a heel 4 and a middle part 5, which lie in one plane on most common boots. An intermediate element 6 is attached to the boot 1 so it can be detached--as can be best seen from Fig. 6--which is comprised of two side pieces 6' arranged on both sides of the sole of the boot and a web 7 connecting these two side pieces 6'. This web 7 is in the middle part 5 of the sole 2, so that its bottom part projects only slightly over the sole. The side pieces 6' are angled upward on the end of the heel by an angle piece 8. The intermediate element 6 is attached to the boot 2 and can be detached by three belts or straps 9, 10 and 11. For this, the side pieces and the angle piece have apertures 12, 13, 14, through which belts 9, 10 and 11 are threaded and are attached forming a loop, for example by being stitched. Belt 9 goes around the heel of the boot 1. Its length is fixed and cannot be changed. Belt 10 goes around the instep of the boot; belt 11 the toe part of the boot. Belts 10 and 11 can be opened completely and their length can be changed, for example with a clip-type closure or a commercially available belt buckle (not shown). The intermediate element 6 in this embodiment has bolts 15 projecting horizontally on both side pieces 6', by which the intermediate element 6 and the boot 1 attached to it can be attached to a binding part 18 on the snowboard. Since the length of belt 9 cannot be changed, the horizontal distance between the bolt 15 and the back of the boot 1 is also clearly set.

Belts 9, 10 and 11 can be relatively wide, in order to distribute the pressure on the boot over the greatest possible surface area. It is also possible to connect the toe belt 11 and the instep belt 10 by an insert of flexible material, not shown, to cover the greatest possible surface area.

The intermediate element 6 is suitable for attachment to almost all types of boots. The only condition is that the distance between the two parallel side pieces 6' is not smaller than the width of the sole. The intermediate element 6 is light-weight. It can be made of aluminum, steel or other metals, and also from solid plastic. Even with the intermediate element buckled on, the snowboarder can walk with the boot without great limitation of movement. If the intermediate element 6 is attached to the snowboard binding part 18 by bolts 15, the boot 1 is also attached by belts 9, 10 and 11 and web 7 permanently to the snowboard, but because of the belt, the boot 1 can still move relative to the intermediate element, i.e., the sole is not fixed with its entire supporting surface.

The bottom part of Fig. 1 shows a snowboard 16 to which a binding base plate 17 is attached. A second binding component 18 is attached to the base plate 17, as well as a heel support 19, which can pivot on a horizontal pivoting axis 20, but only up to a predefined stop, so that it can perform its function as a heel support. In the embodiment shown here, there is a housing 21 attached to the second binding component 18, and it holds a lock 22 that moves longitudinally, which by tensing a spring supported on the lock 22 and one inside wall of the housing, pushes the lock 22 into the closed position. A bolt 24 is attached to the lock 22, which holds the spring 23 and is also mounted so it can move in the housing. There is a tension mechanism 25 on the end of the bolt 24 not facing the lock 22, for example a steel cable or a Bowden pull wire, which goes over an extension 26 up to the back of the heel support 19 and ends in a hand grip 53, which is preferably placed in the area on the upper end of the heel support 19.

The second binding component 18 has two side pieces 18', which are attached to one

another on the base plate 17 some distance apart, and the distance is dimensioned so that the intermediate element 6 can be inserted right between the two side pieces 18'. On top of the side pieces, there is a leading slope 27, which runs diagonally down in the direction of the snowboard surface and at the same time is inclined in the direction of the heel support 19. This leading slope 27 opens into a receptacle for the bolts 15 assigned to the intermediate element 6. The lock 22 projects into the area of the leading slope 27 and holds the bolt 15 in its resting position pushed by the spring 23 in the receptacle aperture. If the lock 22 is pushed by the tension mechanism 25, 26 against the force of the spring, it releases the receptacle aperture for the bolt 15 and it can then be released first vertically up and then along the leading slope 27 diagonally forward/up by the snowboard binding component 18. Above the receptacle for the bolt 15, there is another slope 28 running parallel to the leading slope 27, which holds the bolts 15 during the opening movement.

The binding is closed in this way; the user drops his boot 1 to which the intermediate element 6 is attached down until the bolt 15 projecting on the side is on the leading slope 27. With further downward movement, the leading slope 27 then moves the bolt 15, and the boot is moved back in the direction of the heel support 19. As soon as the bolt hits the front edge of the lock 22, the lock is pushed into the housing 21 against the force of the spring 23, and the bolt 15 can slide further along the leading slope up to the receptacle aperture. As soon as the bolt 15 is in the receptacle, the lock 22 can slide forward again, pushed by the spring 23, and then go over the bolt 15 with its bottom turned toward the snowboard surface and thus be held. So the binding is locked. To keep the toe 3 and heel 4 of the sole on the binding or on the snowboard, there is a recess in the baseplate 17 projecting somewhat above the bottom of the sole 2 because of the web 7 that balances out this difference in height. Such a recess (59 in Fig. 4) can naturally also be made so that there are step-in elements 60 and 61 (Fig. 4) in the toe 3 and heel 4 areas on the baseplate that between them form the recess 59 for the web 7. These step-in elements can also be elastic, for example glued-on rubber plates that allow some equalization of the height. The position of the boot is thus determined by the bolt 15, the corresponding receptacle for the bolt in the snowboard binding element 18 and the toe 3 and heel 4 of the sole. If the boot has a recess

between the toe 3 and the heel 4 into which the web 7 is sunk, the height offset between the bolt 15 and the bottom of the toe 3 and heel 4 will no longer fit exactly. For this purpose, the bolt 15 can be designed to be adjustable in height, for example by making it fit into a longitudinal hole in the side piece 18'. It is also possible to make the step-in elements 60, 61 adjustable in height, for example by using step-in elements of different thicknesses.

To open the binding, the lock 22 is pulled back in the direction of the heel support 19 by the tension mechanism 25, 26, and the user can remove the boot plus the intermediate element 6 from the binding, wherein the bolt runs forward/up, if necessary, by the slope 28.

The binding component 18 is connected to the baseplate 18 [sic] by attachment legs 37, which is clearer in connection with Fig. 2.

Fig. 2 shows a section along line II-II in Fig. 1. A baseplate 17 is attached to the snowboard 16, and for example in DE 42 19 036 C2 by a rotary plate 30, which overlaps a round hole 29 in the base plate 17 with a projecting edge, wherein the rotary plate 30 has holes 31 for screws 32 to go through, which are screwed into threaded bushings on the snowboard 16. The binding component 18 on the snowboard has two side pieces 18' with one-piece attachment legs 37 on it that can be attached to the baseplate with screws 38. The housing 21 is formed by a section for side piece 18', a leg projecting vertically on its upper end and an L-shaped housing cover 33. The lock 22 is mounted inside this housing. The housing cover is screwed onto the side piece 18' or its upper projecting leg with screws 34 and 35. Both side pieces 18' have leading slopes 36 on their top side facing one another that make it easier to insert the intermediate element 6.

Fig. 3 shows two embodiments of the invention in which the binding on the snowboard and the intermediate element are locked by having the bolt 15 able to move in its longitudinal direction and snap into a receptacle hole 54. In the embodiment shown on the right part of Fig. 3, the bolt 15 is placed on the binding component 18 on the snowboard and is pushed "in" into a

locked position by a leaf spring 39. In contrast to the embodiment in Fig. 1, the intermediate element 6 now no longer has the bolt 15, but has the receptacle hole 54, into which the bolt 15 can snap. The corner between the side piece and the web 7 in this case has a slope 43 that makes sure that the bolt 15 is pushed "out" against the force of the spring 39 in the direction of the arrow when the boot is pushed down, so that the intermediate element 6 can be pushed down further until the bolt 15 snaps into the hole 54. To open it, the bolt 15 is pulled by a tension mechanism, not shown here, in the direction of the arrow 40 against the force of the spring 39 to the outside, until it is completely removed from the hole 54, and then the intermediate element 6 and the boot 1 can be detached from the binding component 18 on the snowboard.

The left part of Fig. 3 shows a similar design, which is different from those already described in that the bolt 15 and the spring 39 are in the intermediate element. The intermediate element in this embodiment has an intermediate base 41, on which the bottom of the recess 5 in the boot 1 lies. Between the intermediate base 41 and the web 7, there is a hollow space 42 for the spring 39, part of bolt 15 and an activating mechanism for moving the bolt. In this case, the binding component 18 on the snowboard consists only of an L-shaped angular part comprised of the side piece 18' and the attachment leg 37, and there is a receptacle hole 54' for the bolt in the side piece 18'.

In this variation, the opening mechanism is in the intermediate element 6, so that it also always remains on the boot when the boot 1 is detached from the binding part 18 on the snowboard, which allows it to move the tension mechanism 26 up to a height that is comfortable for the rider, for example up to the belt or hip, so that a tension mechanism 26 pulled up in this way need no longer be removed, for example when riding the lift, when a boot is detached from the snowboard.

In both embodiments in Fig. 3, the leaf spring 39 can be attached to the corresponding side piece 18' or 6', for example, by a rivet.

As can be seen in the left part of Fig. 3, the tension mechanism can go over a deflection roller 55 and then out of the chamber 42 at a suitable place.

In the variation shown on the left in Fig. 3, the side pieces 18' have leading slopes corresponding to the leading slope 27 in Fig. 1, which make sure that the intermediate element 6 and the boot 1 are also properly positioned in relation to the longitudinal direction of the boot. The leading slope 36 shown in Fig. 3 also makes sure that the bolt 15 is pushed in while the binding is being closed. In the variation shown on the right in Fig. 3, this positioning by pushing the boot back in the direction of the heel support is done by having the leading slope 43 designed as a groove, which is inclined diagonally in the side view (view in Fig. 1). Alternately, it can be provided that besides hole 54, there can be projections, not shown, on both side pieces 18' that go into an inclined hole like the leading slopes 27, 28 in Fig. 1. Finally, it can also be provided alternately that the side pieces 18' have projections on the front end of the toe bent inward that are inclined and taper off to the back, so that the front edge of the side pieces is supported on them and thus the intermediate element 6 pushes back in the direction of the heel support 19. Generally speaking, any type of restraint can be used that makes sure that the bolts 15 are positioned properly when the intermediate element 6 goes into the binding opposite the hole 54 or 54'.

Fig. 4 shows a top view of one half of the binding part 18 on the snowboard of the embodiment in Fig. 1. The baseplate 17 is attached to the snowboard 16 by the rotary plate 30 in the way described. Several threaded holes 44, 44', 44" along an axis are made on the baseplate, into which the binding component 18 can be screwed by means of the attachment legs 37. Each attachment leg 37 in the embodiment shown has two longitudinal holes 45 and 46, which make longitudinal adjustment possible. Another example of embodiment can be inferred from Fig. 4 for the arrangement of the lock 22, the spring 23, the bolt 24 and the tension mechanism 25 and 26 in the housing 21. The arrangement of the step-in elements 60 and 61 and the recess 59 formed between them for the web 7 can also be seen.

Fig. 5 shows another embodiment in which a pivoting hook 47 is used as the locking mechanism and is provided on the side piece 18' of the part of the snowboard on the binding side. This pivoting hook 47 can pivot on an axis 48, arranged preferably under the center point of the bolt 15. On its top, it has a slope 50, so that the hook is pivoted into an open position when the bolt 15 is inserted. The hook is tensed by a spring 49 in the closed position and automatically snaps into the closed position when the bolt runs on the slope 50. The section of the side piece 18 that goes from the bolt 15 insertion hole in the direction back toward the heel support 19 has a slope 51 to make sure that the bolt 15 slides into the receptacle, even if the boot is pushed back too hard. Here again, there is a slope 28 next to this slope 51 according to Figure 1 that is used to guide bolt 15.

The tension mechanism 25 for opening the pivoting hook 47 has a nipple 52 on its end, which can be inserted into a correspondingly formed recess in the tension mechanism 47, to form an interlocking connection. Similarly, the other end of the tension mechanism can also be attached to the grip 53. Naturally, this possibility of attachment is also possible with the lock in the embodiment in Figs. 1, 2 and 4 and in Fig. 3.

Fig. 5 shows that an extension 26 of the tension mechanism is held by straps 56 on the heel support 19. With the variation in Fig. 3, in which the unlocking device is assigned to the intermediate element 6, the tension mechanism can be held on the side piece by a similar strap and also by the instep belt 10 or the heel belt 9, so that it also runs up to at least the upper edge of the boot 1.

Fig. 6A shows a top view of the intermediate element 6 in Fig. 1. Figs. 6B and 6C show sections along line VI-VI in Fig. 6A of two variations. Basically the intermediate element 6 is composed of the two side pieces 6' connected to one another by a square web 7 and perpendicular to it. Bolts 15 are attached in the area near the web on the side pieces 6'.

In the variation in Fig. 6B, the side pieces 6' and the web 7 are connected to one another

in one piece, while in the embodiment in Fig. 6C, the side pieces 6' are each L-shaped, i.e., still have a horizontal leg 57, which is connected to the web 7. For example, the legs 57 can be welded to the web 7. It can be seen very clearly from Fig. 6 that the intermediate element 6 is a simply designed, light frame-like structure that can be buckled to any shoe using the belts 9, 10 and 11.

The bottom of the web 7 facing the snowboard has grooves 58, which are designed preferably as longitudinal grooves (in relation to the longitudinal axis of the boot) and make sure that snow sticking to the web 7 is scraped off when the binding is being closed. Since the bottom of the web 7 lies basically in the same plane as the bottom of the remaining parts of the sole 3, 4, when the binding is closed, the web 7 lies on the baseplate of the snowboard. Otherwise, the toe 3 and heel 4 would not be lying on it at the same time and the boot would tilt on the bolts 15. The snow-scraping grooves 58 prevent the binding from not being closed.

Patent Claims

1. A snowboard binding with a first binding element connected permanently to the snowboard (18), a second binding element (6) connected to the snowboard boot (1), a locking device (15, 22; 54, 47) to connect the two binding elements (6, 18) so they interlock and an unlocking device (25, 26, 50) to release the connection between the two binding elements (6, 18), characterized by the fact that the second binding element is designed as a frame-type intermediate element (6) which can be connected to the snowboard boot (1) and detached from it by means of flexible tension mechanisms (9, 10, 11) and by the fact that there is a heel support (19) on the first binding element (18) to support the back of the snowboard boot (1).

2. The snowboard binding in Claim 1, characterized by the fact that the intermediate element (6) has two side pieces (6') arranged on the side of the sole (2) of the snowboard boot (1) which are connected to one another by a web (7), and the web (7) is arranged in the area (5) between the toe (3) and heel (4) of the sole (2).

3. The snowboard binding in Claim 1 or 2, characterized by the fact that there is a flexible heel belt (9) on the intermediate element (6) that cannot be adjusted in length and a flexible instep belt (10) that can be opened and adjusted.

4. The snowboard binding in Claim 3, characterized by the fact that there is also a flexible toe belt (11) that can be opened and adjusted on the intermediate element (6).

5. The snowboard binding in Claim 3 or 4, characterized by the fact that the adjustable belts (10, 11) have a clip-type closure.

6. The snowboard binding in Claim 3, 4 or 5, characterized by the fact that the adjustable belts (10, 11) are designed to have large surface areas and are made so that they fit the shape of the part of the snowboard boot (1) they cover.

7. The snowboard binding in one of Claims 1 to 6, characterized by the fact that one of the binding elements (6 or 18) has two bolts (15) arranged horizontally and projecting over the contour of the binding element and by the fact that there is a moving locking element (22, 47) on the other binding element, which is pushed by a spring (23, 49) into a locked position, in which it holds the bolt (15) in a locked position and by the fact that the locking element is pushed into an open position by the bolt (15) in the process of closing the binding.

8. The snowboard binding in one of Claims 1 to 6, characterized by the fact that on one of the two binding elements (6, 18), there is a bolt (15) projecting laterally over its contour and pushed into a locked position by a spring (39) and by the fact that on the other binding element there is a hole (54) into which the bolt (15) snaps.

9. The snowboard binding in Claim 8, characterized by the fact that the bolt (15) is on the intermediate element (6).

10. The snowboard binding in Claim 8, characterized by the fact that the bolt (15) is on the binding part (18) on the snowboard.

11. The snowboard binding in one of Claims 1 to 7, characterized by the fact that the locking element is a lock (22) that moves linearly and is pushed into a locked position by a spring (23).

12. The snowboard binding in one of Claims 1 to 7, characterized by the fact that the locking element is a hook that is pushed by a spring (49) into a locked position and that can swivel on an axis (48).

13. The snowboard binding in one of Claims 7 to 12, characterized by the fact that the binding element (6, 18) into which the bolt (15) of the other binding element can snap has a leading slope (27, 36, 43), on which the bolt (15) runs when the binding makes a closing movement, wherein this slope is aligned so that the intermediate element (6) is pushed in the direction of the snowboard with its downward movement and at the same time in the direction of the heel support (19).

14. The snowboard binding in one of Claims 1 to 13, characterized by the fact that the snowboard binding element (18) is adjustable and is attached opposite a baseplate (17) connected permanently to the snowboard (16) by means of longitudinal holes (45, 46).

15. The snowboard binding in one of Claims 2 to 14, characterized by the fact that the web (7) of the intermediate element (6) has snow-scraping grooves (58) on the bottom of it.

16. The snowboard binding in one of Claims 2 to 15, characterized by the fact that the baseplate 17 has a recess (59) to hold the web (7).

6 pages of drawings attached